

REMARKS

Claims 1-12 and 14-21 are pending in the present Application. Claims 1-16 and 19-21 have been canceled, no claims have been amended, and claims 22-34 have been added by this Amendment and Response, leaving Claims 17-18 and 20-35 for consideration upon entry of the present Amendment.

New Claims

Claims 22-35 have been added to better define the invention. Antecedent basis for claims 22-35 can be found in claims 2-4 as originally filed 6-13; paragraph [0015] and the Examples.

Reconsideration and allowance of the claims are respectfully requested in view of the above amendments and the following remarks.

Claim Objections

Claim 15 is objected to as being dependent upon a rejected base claim. Claim 15 has been cancelled rendering the objection moot.

Claim Rejections Under 35 U.S.C. § 103(a)

Claims 1-12, 14 and 16-21 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over White et al. (US 4,760,118)(“White”) in view of Geprags et al (US 2003/0130403 A1)(“Geprags”), and further in view of Adedeji et al. (US 6,872,777) and Jalbert et al (US 4,654,405)(“Adedeji”). (Office Action dated 10/27/2008, page 3) Applicants respectfully traverse this rejection.

Claims 1-6, 8-12, 14 and 16-21 stand rejected under 35 U.S.C. § 103(a), as allegedly obvious over White et al (US 4,760,118) in view of Adedeji et al. (US 6,872,777) and Jalbert et al (US 4,654,405). (Office Action dated 10/31/2008, page 4) Applicants respectfully traverse this rejection.

Independent claims 17 and 32 are directed to method of making a poly(arylene ether) composition comprising melt blending a poly(arylene ether) with one or more capping agents selected from the group consisting of salicylic acid ester and anthranilic acid ester and a

component selected from the group consisting of impact modifier, alkenyl aromatic polymers, reinforcing filler, flame retardant and combinations of two or more of the foregoing. Thus, the claimed methods require melt blending a poly(arylene ether), one or more capping agents and a component selected from the group consisting of impact modifier, alkenyl aromatic polymers, reinforcing filler, flame retardant and combinations of two or more of the foregoing, in a single reaction. Claim 34 is directed to a composition prepared according to the method of claim 17. Claims 1-12, 14, 16 and 19-21 have been canceled.

“A patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *KSR Int’l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007). To find obviousness, the Examiner must “identify a reason that would have prompted a person of ordinary skill in the art in the relevant field to combine the elements in the way the claimed new invention does.” *Id.*

White discloses a capping method comprising reacting said polyphenylene ether in the melt with at least one ester of salicylic acid or anthranilic acid or a substituted derivative thereof. (Col. 5, lines 9-13) White further discloses precipitating and washing the capped poly(arylene ether). (Col. 9, lines 1-5) However, in contrast to the claimed method, White fails to disclose a method of making a poly(arylene ether) composition comprising melt blending a poly(arylene ether) with one or more capping agents selected from the group consisting of salicylic acid ester and anthranilic acid ester and a component selected from the group consisting of impact modifier, alkenyl aromatic polymers, reinforcing filler, flame retardant and combinations of two or more of the foregoing. In fact, White fails to disclose any components or additives such as impact modifiers, alkenyl aromatic polymers,, reinforcing fillers and/or flame retardants. As White fails to disclose any components or additives, Applicants respectfully assert that White would not have prompted a person of ordinary skill in the art to combine additives into White’s method for preparing capped poly(arylene ether) in the way the claimed invention does.

Geprags is cited for disclosing the use of additives, such as impact modifiers, reinforcing filler and flame retardants, in thermoplastic compositions in order to improve mechanical properties. (Office Action dated 10/27/2008, page 3) Geprags is directed to a composition comprising a syndiotactic vinylaromatic polymer, inorganic filler, an elastomeric,

particulate graft polymer, a compatibilizer, an optional elastomeric particulate styrene-diene block copolymer, and an optional thermoplastic elastomer. (Abstract) Although Geprags does disclose additives which may be added to polymer compositions, Geprags does not disclose a method of making a poly(arylene ether) composition as claimed, wherein the method comprises melt blending a poly(arylene ether) with one or more capping agents selected from the group consisting of salicylic acid ester and anthranilic acid ester and a component selected from the group consisting of impact modifier, alkenyl aromatic polymers, reinforcing filler, flame retardant and combinations of two or more of the foregoing. Geprags provides no guidance regarding the how a capping agent would affect the additives when the method comprises melt blending a poly(arylene ether) with one or more capping agents selected from the group consisting of salicylic acid ester and anthranilic acid ester and a component selected from the group consisting of impact modifier, alkenyl aromatic polymers, reinforcing filler, flame retardant and combinations of two or more of the foregoing in a single reaction.

Adedeji is cited for teaching various additives, such as hydrogenated SEBS block copolymer, thermal stabilizers and glass fibers to improve mechanical properties of poly(arylene ether) compositions. (Office Action dated 10/27/2008, page 4) Adedeji is generally directed to compositions comprising a poly(arylene ether), a poly(alkenyl aromatic) resin, a polyolefin, and a selectively hydrogenated block copolymer of an alkenyl aromatic compound and a conjugated diene. (Abstract) Although Adedeji does disclose additives which may be added to polymer compositions, Adedeji does not disclose a method of making a capped poly(arylene ether) composition as claimed. Further, like Geprags, Adedeji provides no guidance regarding the how a capping agent would affect the additives when the method comprises melt blending a poly(arylene ether) with one or more capping agents selected from the group consisting of salicylic acid ester and anthranilic acid ester and a component selected from the group consisting of impact modifier, alkenyl aromatic polymers, reinforcing filler, flame retardant and combinations of two or more of the foregoing in a single reaction.

Jalbert is disclosed for teaching various additives, such as impact modifiers, stabilizers antioxidants and fillers thermoplastic compositions. (Office Action dated 10/27/2008, page 4) Jalbert is generally directed carboxylated polyphenylene ether resins. (Abstract)

Carboxylation of the polyphenylene ether is carried out by melt blending a mixture of a polyphenylene ether and an ethylenically unsaturated carboxylic compound. (Col. 2, lines 27-41) The carboxylated polyphenylene ether resins can be combined with polyamides. (Col. 4, lines 6-10) Jalbert further teaches that powder and pelletized resin comprising carboxylated polyphenylene ether resins and polyamides can be combined with additives, such as impact modifiers and fillers. (Col. 4, lines 25-38) Although Jalbert does disclose additives which may be added to polymer compositions, Jalbert does not disclose a method of making a poly(arylene ether) composition as claimed.

Further, Jalbert provides no guidance regarding the how a capping agent would affect the additives when melt blending together with the poly(arylene ether) and capping in a single reaction. Moreover, Applicants believe that Jalbert specifically teaches away from methods of modifying polyphenylene ether in the presence of additives, such as impact modifiers, alkenyl aromatic polymers, reinforcing fillers and/or flame retardants. Jalbert discloses that the carboxylated phenylene ether resin produced in this process step may be used directly in preparing alloys with polyamides. (Col. 3, lines 12-14) However, since the interaction of the carboxylic compound with the polyphenylene ether resin may be incomplete, and the carboxylated polyphenylene ether may thus contain a substantial portion of unattached carboxylic compound, either as unreacted carboxylic compound or as a low-molecular weight reaction by-product, Jalbert suggests removal of any remaining low molecular weight carboxylic compounds. (Col. 3, lines 14-33) While the disclosure of Jalbert is specific to preparing carboxylated polyphenylene ether, the need to remove residual reagents (i.e., capping agent) to minimize the affect the reagents may have on downstream processes applies to methods of preparing capped polyphenylene ether. Thus, Jalbert is informative for acknowledging that the affect that residual reagents, whether the additive is a carboxylating agent or capping agent, is unknown and unpredictable. For this reason, Applicants believe that Jalbert teaches away from preparing a poly(arylene ether) composition comprising melt blending a poly(arylene ether) with one or more capping agents selected from the group consisting of salicylic acid ester and anthranilic acid ester and a component selected from the group consisting of impact modifier, alkenyl aromatic polymers, reinforcing filler, flame retardant and combinations of two or more of the foregoing. To the contrary, Jalbert supports

precipitating and washing the modified poly(arylene ether) prior to blending with additives.

Furthermore, Applicants respectfully assert that even if a skilled artisan prepared a composition comprising the capped PPE disclosed by White with the additives disclosed by Geprags, Adedeji and Jalbert, the resulting composition would be substantially different from a composition prepared according to the claimed methods. The claimed method not only allows for a poly(arylene ether) composition contain residual capping agent, the claimed method allows for the capping agent to interact with the components, such as impact modifiers, reinforcing filler and flame retardants. As the capping agent is melt blended in combination with the a poly(arylene ether), capping agents and additives in a single reaction, the resulting product was unexpected and unobvious over the combination of White, Geprags, Adedeji and Jalbert. Prior to Applicants invention it was unknown to one of skill in the art how the capping agent would react with the impact modifier and other additives when the poly(arylene ether) composition is prepared by melt blending a poly(arylene ether), capping agents and additives in a single reaction. In contrast, since the capped poly(arylene ether) prepared according to White has been precipitated and washed, thereby removing any residual capping agent, prior to mixing or melted blending capped poly(arylene ether) with any other additives, the affect/interaction that the capping agent would have on additives such as impact modifiers, reinforcing filler and flame retardants is not an issue. The combination of references does not disclose a method as claimed. Nor does the combination suggest a method of preparing capped poly(arylene ether) wherein components, such as impact modifiers, reinforcing filler and flame retardants, are added to the melt blend prior to precipitating and washing the capped poly(arylene ether). Even if the references were combined in a manner suggested by the Examiner, Applicants respectfully assert that the presence of all components (i.e., a poly(arylene ether), capping agents and additives) in a single reaction method is substantially different than a method which mixes a previously capped a poly(arylene ether) with additives. Further, since a poly(arylene ether) composition prepared according to the claimed method would contain residual capping agent, and further since the affect that the capping agent would have on additives such as impact modifiers, reinforcing filler and flame retardants is unknown and unpredictable, Applicants respectfully assert that a composition prepared according to the claimed method would be different from a compositions prepared by mixing

previously prepared/isolated capped poly(arylene ether) with the same additives..

In summary, Applicants respectfully assert that a *prima facie* case of obviousness has not been established because the combination of White, Geprags, Adedeji and Jalbert fails to disclose a method of making a poly(arylene ether) composition, wherein the method requires melt blending a poly(arylene ether) with one or more capping agents selected from the group consisting of salicylic acid ester and anthranilic acid ester and a component selected from the group consisting of impact modifier, alkenyl aromatic polymers, reinforcing filler, flame retardant and combinations of two or more of the foregoing. Nor does the combination suggest a method of preparing capped poly(arylene ether) wherein components, such as impact modifiers, reinforcing filler and flame retardants, are added to the melt blend prior to isolation of the capped poly(arylene ether). Applicants respectfully request a withdrawal of the rejection and allowance of the claims.

Claims 1-12, 14 and 16-21 stand rejected under 35 U.S.C. § 103(a), as allegedly obvious over Braat et al. (US 6,306,978) in view of Geprags et al. (US 2003/0130403 A1). (Office Action dated 10/27/2008, page 5) Applicants respectfully traverse this rejection.

Independent claims 17 and 32 are directed to method of making a poly(arylene ether) composition comprising melt blending a poly(arylene ether) with one or more capping agents selected from the group consisting of salicylic acid ester and anthranilic acid ester and a component selected from the group consisting of impact modifier, alkenyl aromatic polymers, reinforcing filler, flame retardant and combinations of two or more of the foregoing. Thus, the claimed methods require melt blending a poly(arylene ether), one or more capping agents and a component selected from the group consisting of impact modifier, alkenyl aromatic polymers, reinforcing filler, flame retardant and combinations of two or more of the foregoing, in a single reaction. Claim 34 is directed to a composition prepared according to the method of claim 17. Claims 1-12, 14, 16 and 19-21 have been canceled.

Braat discloses a capped poly(phenylene ether) resin and a method of capping a poly(phenylene ether) resin using a capping agent (Abstract). The capping agent is an ester of salicylic acid or anthranilic acid (Col. 4, lines 1-7). The resin composition may further comprise a polystyrene. (Col. 6, lines 19-20). The method capping a poly(phenylene ether)

resin using a capping agent discloses by Braat comprises heating poly(phenylene ether) in a solution, wherein aromatic solvents such as benzene, toluene, xylene and o-dichlorobenzene are used. (Col. 5, lines 46-52) Alternatively, the capping agent can be mixed without a solvent in a melt. (Col. 57-59) The capped poly(phenylene ether) may be isolated in a variety of manners, e.g., by non-solvent precipitation followed by collection of the capped PPE, through direct devolatilization of the solvent, by chipping, or spray drying. (Col. 7, lines 24-28) Braat does not teach or disclose a component selected from the group consisting of an impact modifier, reinforcing filler, flame retardant and combinations of two or more of the foregoing as required by independent Claims 17 and 32. Therefore, Braat cannot to disclose a method of making a poly(arylene ether) composition comprising melt blending a poly(arylene ether) with one or more capping agents selected from the group consisting of salicylic acid ester and anthranilic acid ester and a component selected from the group consisting of impact modifier, alkenyl aromatic polymers, reinforcing filler, flame retardant and combinations of two or more of the foregoing. In fact, Braat fails to disclose any components or additives such as impact modifiers, alkenyl aromatic polymers,, reinforcing fillers and/or flame retardants. As Braat fails to disclose any components or additives, Applicants respectfully assert that Braat would not have prompted a person of ordinary skill in the art to combine additives into Braat method for preparing capped poly(arylene ether) in the way the claimed invention does.

Geprags is cited for disclosing the use of additives, such as impact modifiers, reinforcing filler and flame retardants, in thermoplastic compositions in order to improve mechanical properties. (Office Action dated 10/27/2008, page 3) Geprags is directed to a composition comprising a syndiotactic vinylaromatic polymer, inorganic filler, an elastomeric, particulate graft polymer, a compatibilizer, an optional elastomeric particulate styrene-diene block copolymer, and an optional thermoplastic elastomer. (Abstract) As explained in paragraphs [0055] to [0056] the compatibilizer may be a poly(arylene ether) and is present in an amount of 1 to 10 percent by weight. Although Geprags does disclose additives which may be added to polymer compositions, Geprags does not disclose a method of making a poly(arylene ether) composition as claimed.

In summary, Applicants respectfully assert that a *prima facie* case of obviousness has

not been established because the combination of Braat and Geprags fails to disclose a method of making a poly(arylene ether) composition, wherein the method requires melt blending a poly(arylene ether) with one or more capping agents selected from the group consisting of salicylic acid ester and anthranilic acid ester and a component selected from the group consisting of impact modifier, alkenyl aromatic polymers, reinforcing filler, flame retardant and combinations of two or more of the foregoing. Nor does the combination suggest a method of preparing capped poly(arylene ether) wherein components, such as impact modifiers, reinforcing filler and flame retardants, are added to the melt blend prior to precipitating and washing the capped poly(arylene ether). Applicants respectfully request a withdrawal of the rejection and allowance of the claims.

Double Patenting

Claims 1-12, 14 and 19 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-46 of U.S. Patent No. 7,119,136 and claims 1-47 of U.S. Patent No. 7,101,923. (Office Action dated 10/27/2008, page 2) Claims 1-12, 14 and 19 have been cancelled rendering the rejection moot. Applicants respectfully request a withdrawal of the rejection and allowance of the claims.

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance are requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 50-1131.

Respectfully submitted,

CANTOR COLBURN LLP

By /Ian J.S. Lodovice/
Ian J.S. Lodovice
Registration No. 59,749

By /Patricia S. DeSimone/
Patricia S. DeSimone
Registration No. 48,137

Date: January 27, 2009
CANTOR COLBURN LLP
20 Church Street
22nd Floor
Hartford, CT 06103
Telephone: (860) 286-2929
Facsimile: (860) 286-0115
Customer No.: 43249